What is claimed is:

1. An optical fiber comprising:

a core; and

a cladding layer including a plurality of nano-particles around the core.

2. The optical fiber of claim 1, wherein the cladding layer includes a filler.

3. The optical fiber of claim 2, wherein the filler includes at least one of a polymer, synthetic oil, poly-siloxane and Teflon.

4. The optical fiber of claim 1, further including an overclad layer around the cladding layer.

5. The optical fiber of claim 1, wherein the overclad layer includes Teflon.

6. The optical fiber of claim 1, wherein the core is a silica glass core.

7. The optical fiber of claim 1, wherein the cladding layer includes nano-particles of at least one of a ceramic, silica, molybdenum disulfide, Teflon and a metallic oxide.

8. The optical fiber of claim 8, wherein the metallic oxide is one of titanium oxide, aluminum oxide and magnesium oxide.

9. The optical fiber of claim 1, wherein the nano-particles are hydrophilic.

10. The optical fiber of claim 1, wherein the nano-particles are a mix of hydrophilic and hydrophobic particles.

11. The optical fiber of claim 1, wherein the cladding layer includes a plurality of layers of nano-particles, the plurality of layers having different hydrophobicity characteristics.

12. The optical fiber of claim 1, wherein the cladding layer includes an inner layer of metallic oxide nano-particles and outer layer of silica nano-particles.

13. The optical fiber of claim 1, wherein the cladding layer includes an inner layer of molybdenum disulfide nano-particles and outer layer of Teflon.

14. The optical fiber of claim 1, wherein the cladding layer includes a resin foam.

15. The optical fiber of claim 1, wherein the cladding layer includes a thixotropic material.

16. An optical fiber bundle comprising:

a plurality of cores; and

a cladding layer including a plurality of nano-particles,

wherein the plurality of cores are embedded within the same cladding layer.

17. The optical fiber of claim 16, wherein the cladding layer includes a filler.

18. The optical fiber of claim 17, wherein the filler includes at least one of a polymer, synthetic oil, poly-siloxane and Teflon.

19. The optical fiber of claim 16, further including an overclad layer around the cladding layer.

20. The optical fiber of claim 16, wherein the cladding layer includes nano-particles of at least one of a ceramic, silica, Teflon, molybdenum disulfide and a metallic oxide.

21. The optical fiber of claim 16, wherein the nano-particles are a mix of hydrophilic and hydrophobic particles.

22. An optical transmission structure comprising:

a substrate;

a waveguide on the substrate; and

a cladding layer including a plurality of nano-particles over the waveguide.

23. The optical transmission structure of claim 22, wherein the cladding layer includes a filler.

24. The optical transmission structure of claim 23, wherein the filler includes at least one of a polymer, synthetic oil, poly-siloxane and Teflon.

25. The optical fiber of claim 22, wherein the nano-particles are formed of at least one of a ceramic, silica, Teflon, molybdenum disulfide and a metallic oxide.

26. An optical transmission structure comprising:

a substrate;

a plurality of waveguides stacked on the substrate; and

a cladding layer including a plurality of nano-particles over the waveguides and between the waveguides.

27. The optical transmission structure of claim 26, wherein the cladding layer includes a filler.

28. The optical transmission structure of claim 27, wherein the filler includes at least one of a polymer, synthetic oil, poly-siloxane and Teflon.

29. The optical transmission structure of claim 26, wherein the waveguides are silica glass waveguides.

30. The optical transmission structure of claim 26, wherein the nano-particles include at least one of a ceramic, silica, Teflon, molybdenum disulfide and a metallic oxide.

31. The optical transmission structure of claim 26, wherein the nano-particles are hydrophilic.

32. The optical transmission structure of claim 26, wherein the nano-particles are a mix of hydrophilic and hydrophobic particles.

33. A method of manufacturing a fiber structure comprising the steps of:

forming a fiber core; and

coating a fiber core with a cladding layer that includes nano-particles.

34. The method of claim 33, further including the step of forming an overclad layer over the cladding layer.

35. The method of claim 33, wherein the coating step forms an inner layer of nano-particles, and an outer layer of nano-particles, the inner and outer layers having dissimilar hydrophobicity.

36. The method of claim 35, wherein the coating step includes the step of negatively charging the fiber core, positively charging the inner layer, and negatively charging the outer layer.

37. The method of claim 33, wherein the inner layer includes metallic oxide nano-particles, and the outer layer includes silica nano-particles.

38. The method of claim 33, wherein the coating step includes the step of immersing the fiber structure in a water-alcohol medium that includes the nano-particles.

39. The method of claim 33, wherein the coating step includes the step of drying the fiber structure azeotropically.

40. The method of claim 33, wherein the coating step includes the step of drawing the fiber core through a paste that includes the nano-particles.

41. The method of claim 33, wherein the coating step includes the steps of:

applying a polymer with the nano-particles to the fiber core; and

drying the polymer.

42. The method of claim 33, wherein the coating step forms the cladding layer that includes a filler in which the nano-particles are embedded.

43. A method of manufacturing a light transmission structure comprising the steps of:

forming a waveguide on a substrate; and

forming a cladding layer on the waveguide, the cladding layer including nano-particles.